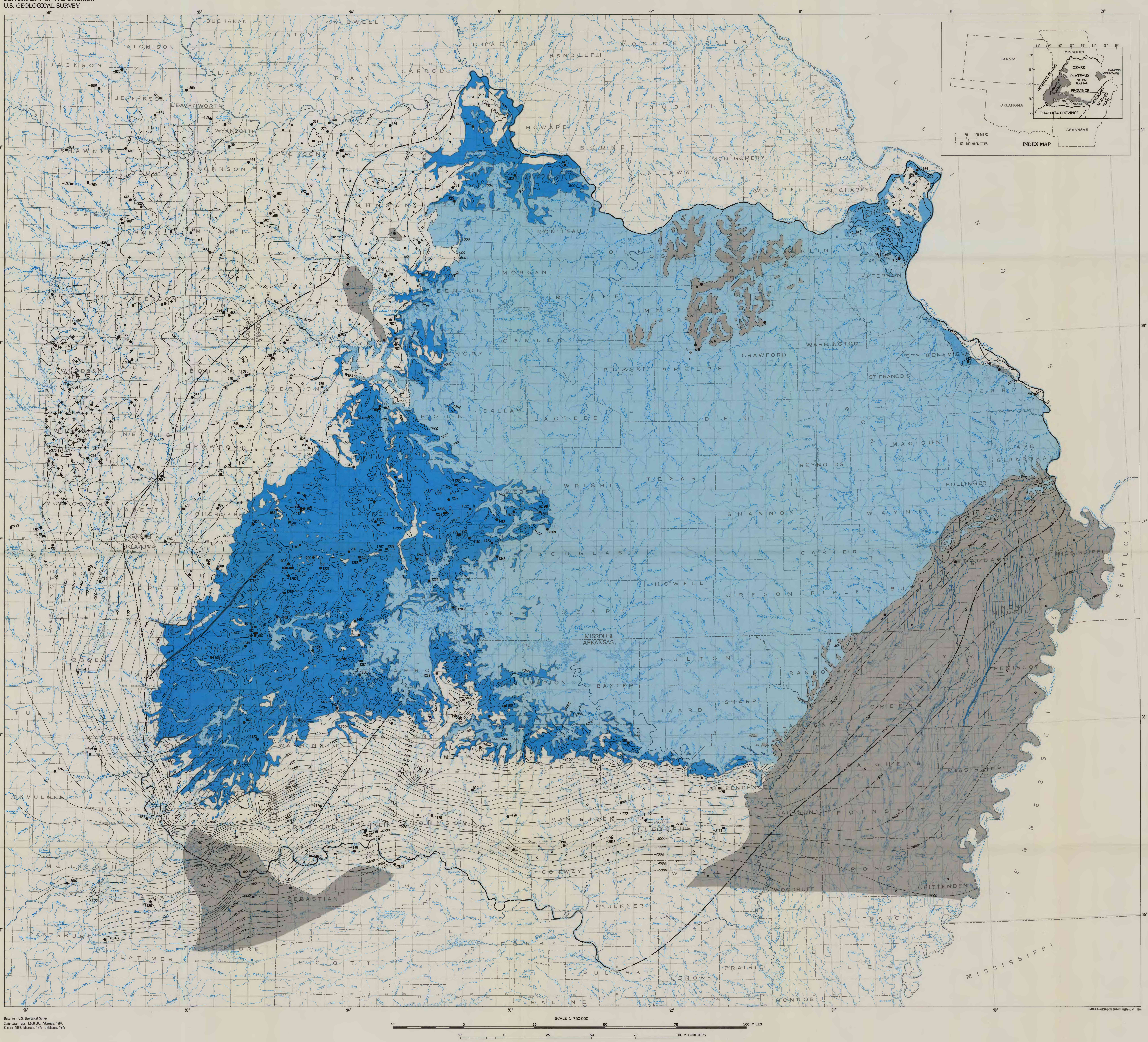

Base from U.S. Geological Survey
State base maps, 1:500,000; Arkansas, 1967;
Kansas, 1963; Missouri, 1973; Oklahoma, 1972

EXPLANATION

- Outcrop area of Springfield Plateau aquifer
- Outcrop area of unnamed geohydrologic units that are stratigraphically equivalent to the Springfield Plateau aquifer (see text)
- Outcrop area of rocks comprising geohydrologic units older than Springfield Plateau aquifer
- Area where Springfield Plateau aquifer and stratigraphically equivalent units are missing in subsurface

- **Contact**
- **Fault**—U, upthrown side; D, downthrown side
- **Approximate boundary of Ozark Plateaus aquifer system**
- 500 **Structure contour**[1]—Shows altitude of top of Springfield Plateau aquifer and stratigraphically equivalent units. Contours in areas of few control points are consistent with control points and contours on maps of overlying and underlying geohydrologic units. Contours drawn in outcrop areas are modified from 1:500,000 scale, Missouri, Arkansas, Kansas, and Oklahoma State base maps. Hachures indicate depression. Contour interval, in part variable. National Geodetic Vertical Datum of 1929
- -500 **Structure contour (Dashed)**[1]—Shows altitude of top of next stratigraphically lower geohydrologic unit where Springfield Plateaus aquifer and equivalent units are missing in the subsurface. Hachures indicate depression. Contour interval, in part, variable. National Geodetic Vertical Datum of 1929
- 822 **Control data point**[1]—Part of Central Midwest Regional Aquifer-System Analysis data base. Number is altitude, in feet, of top of Springfield Plateau aquifer and stratigraphically equivalent geologic units. National Geodetic Vertical Datum of 1929
- **Auxiliary control data point**[1]
- + **Supplementary control data point**[1]—Control points from published map of top of Mississippian rocks in Kansas (Merriam, 1960)

[1] Contours and control points beyond the boundary of the Ozark Plateaus aquifer system are for units stratigraphically equivalent to those of the Ozark Plateaus aquifer system

INTRODUCTION

An investigation of the geohydrologic system in the Ozark Plateaus province (index map and Fenneman, 1938) has been made as part of the Central Midwest Regional Aquifer-System Analysis (Jorgensen and Signor, 1981), a major study that encompasses parts of 10 States. The study is one of several by the U.S. Geological Survey that are designed to increase knowledge of the flow regime and geohydrologic properties of regional aquifer systems in the United States. Because a large amount of fresh ground water is available in aquifers underlying the Ozark Plateaus province, a subregional project has been established to study the geohydrologic units of this area in more detail than is practical in the regional study. The stratigraphic relationships among the primary geohydrologic units in the Ozark Plateaus province is discussed in Chapter A of this Hydrologic Investigations Atlas series. This chapter focuses on one of those geohydrologic units, the Springfield Plateau aquifer.

THE SPRINGFIELD PLATEAU AQUIFER

DEFINITION

The Springfield Plateau aquifer, widely used in the southwestern part of the Ozark Plateaus province as a source for domestic- and stock-water, is a sequence of Mississippian limestone that comprise the uppermost aquifer in the Ozark Plateaus aquifer system. In northern Arkansas the aquifer is represented by the Boone Formation. Elsewhere, the aquifer is composed of several limestone units ranging from the basal Pierson Formation to the uppermost Moorefield Formation, the Burlington and Keokuk Limestones being the primary water-yielding rocks. Although the Moorefield Formation is included as part of the Springfield Plateau aquifer in northeastern Oklahoma, the shale content of the formation increases in northern Arkansas where the geologic unit is not considered to be part of the aquifer. The boundary of the aquifer approximately coincides with the limit of freshwater flow (less than 1,000 milligrams-per-liter dissolved-solids concentration) along the west and southwest edge of the Ozark Plateaus.

Geologic units common to those of the Springfield Plateau aquifer exist in St. Louis, Jefferson, and Ste. Genevieve Counties, Missouri, at the extreme northeast fringe of the Ozark Plateau province. These rocks are not in direct hydraulic connection with those of the Springfield Plateau aquifer in the western part of the province. Because the rocks are stratigraphically equivalent to the Springfield Plateau aquifer and have similar hydraulic properties, they are briefly described in this report. However, the rocks are considered a part of an independent, water-yielding unit on the northeast flank of the Ozark Plateaus.

GENERALIZED STRATIGRAPHIC COLUMN SHOWING GEOLOGIC FORMATIONS THAT COMPRISE THE SPRINGFIELD PLATEAU AQUIFER.

ERATHEN	SYSTEM	SOUTHEASTERN MISSOURI	SOUTHWESTERN MISSOURI	SOUTHEASTERN KANSAS	NORTHEASTERN OKLAHOMA	NORTHERN ARKANSAS	GEOHYDROLOGIC UNIT
PALEOZOIC	MISSISSIPPIAN	Aux Vases Sandstone	Carterville Formation		Hindsville Limestone		
						Moorefield Formation	
		Ste. Genevieve Limestone[1] St. Louis Limestone[1] Salem Limestone[1] Warsaw Limestone[1] Keokuk Limestone[1] Burlington Limestone[1] Fern Glen Limestone[1]	St. Louis Limestone Salem Limestone Warsaw Limestone Keokuk Limestone Burlington Limestone Elsey Formation Reeds Spring Formation Pierson Formation	St. Louis Limestone Salem Limestone Warsaw Limestone Keokuk Limestone Burlington Limestone Fern Glen Limestone	Moorefield Formation Keokuk Limestone Boone Formation	Boone Formation	Springfield Plateau aquifer
		Chouteau Limestone	Northview Shale	Chouteau Limestone	Northview Equivalent		

[1] Geologic formation in southeastern Missouri that is stretigraphically equivalent to geologic formations in the Springfield Plateau aquifer, but not part of the aquifer.

STRUCTURAL FEATURES

Rocks comprising the Springfield Plateau aquifer apparently were removed from much of the Ozark Plateaus province by erosion after uplift of the Ozark dome, a broad, structural high that predominates in the study area. The Springfield Plateau aquifer crops out around the western and southern perimeter of the Salem Plateau and throughout an area that extends into northeastern Oklahoma along a southwest trending ridge of the Ozark dome. In western Missouri, the aquifer dips into the subsurface west of the Springfield Plateau at about 11 feet per mile. The dip increases to about 30 feet per mile in northeastern Oklahoma near the Kansas border. At the extreme southwest edge of the Ozark Plateaus aquifer system and beneath the Boston Mountains (index map) in northern Arkansas, the southward dip of the Springfield Plateau aquifer is as much as 140 feet per mile. Although the altitude of the top of the aquifer generally is greater than 400 feet (about 500 feet below land surface) at the western boundary of the Ozark Plateaus aquifer system, the altitude of the top of the aquifer near its southern boundary can be about 5,000 feet below sea level (about 5,600 feet below land surface). The aquifer has been removed from the Mississippi Alluvial Plain to the southeast by erosion.

Geohydrologic units that are stratigraphically equivalent to the Springfield Plateau aquifer crop out in eastern Missouri along the Missouri and Mississippi Rivers, except where the rocks are covered by alluvial sediments or Pennsylvanian rocks. Contours on top of the units in St. Louis County, Missouri, primarily are based on topography. Farther south in Ste. Genevieve County, Missouri, the rocks dip abruptly into Illinois.

CONVERSION FACTORS

Multiply inch-pound unit	By	To obtain SI unit
foot	0.3048	meter
mile	1.609	kilometer
foot per mile	0.1894	meter per kilometer

Altitude of top of Springfield Plateau aquifer

MAJOR GEOHYDROLOGIC UNITS IN AND ADJACENT TO THE OZARK PLATEAUS PROVINCE, MISSOURI, ARKANSAS, KANSAS, AND OKLAHOMA—SPRINGFIELD PLATEAU AQUIFER

By
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1990

For sale by U.S. Geological Survey Map Distribution,
Box 25286, Federal Center, Denver, CO 80225